

## New records of *Encarsia* (Hymenoptera: Chalcidoidea: Aphelinidae) parasitising Aleyrodidae (Hemiptera: Sternorrhyncha) in Iran, with the description of a new species

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*Abstract.*—New records of aphelinids parasitizing several aleyrodid species in Iran are provided. *Encarsia alemansoori* Rasekh & Polaszek, n. sp., is described and illustrated. It is known so far from Iran only, and all known specimens were reared from the whitefly *Aleuroclava jasmini* (Takahashi). *Encarsia hamata* Huang & Polaszek is recorded for the first time from Iran, from the same host, and from *Aleurolobus marlatti* (Quaintance). *Encarsia hamata* is also recorded for the first time from Japan, from *Bemisia shinanoensis* Kuwana.

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*Encarsia* species are mostly parasitoids of whiteflies and armoured scale insects (Diaspididae), and are of considerable economic importance. The systematics and biology of the genus are treated in detail by Heraty et al. (2008).

The purpose of this paper is to provide new records of *Encarsia* species, including a new species, reared from several aleyrodid species in Fars (Shiraz) Province in Iran. *Encarsia alemansoori* is clearly a member of the *Encarsia perflava*-group (see diagnosis below). It differs from all other known species of the *perflava*-group in the arrangement and structure of antennomeres 1–3 and their associated sensilla. The host, *Aleuroclava jasmini* (Takahashi) was described from the Oriental region (Taiwan, Takahashi 1932) and is now widespread throughout the tropics and subtropics, and thought to be established in parts of the New World where it has been introduced (Gill 1996). *Encarsia hamata* Huang & Polaszek is recorded for the first time outside China, from Iran and Japan.

Genomic DNA was successfully extracted from both species ( $n=2$  *E. alemansoori*,  $n=6$  *E.*

*hamata*) using a non-destructive protocol. Two males of *E. alemansoori* were prepared for examination with Scanning Electron Microscopy by gold coating; these specimens were later remounted on card rectangles.

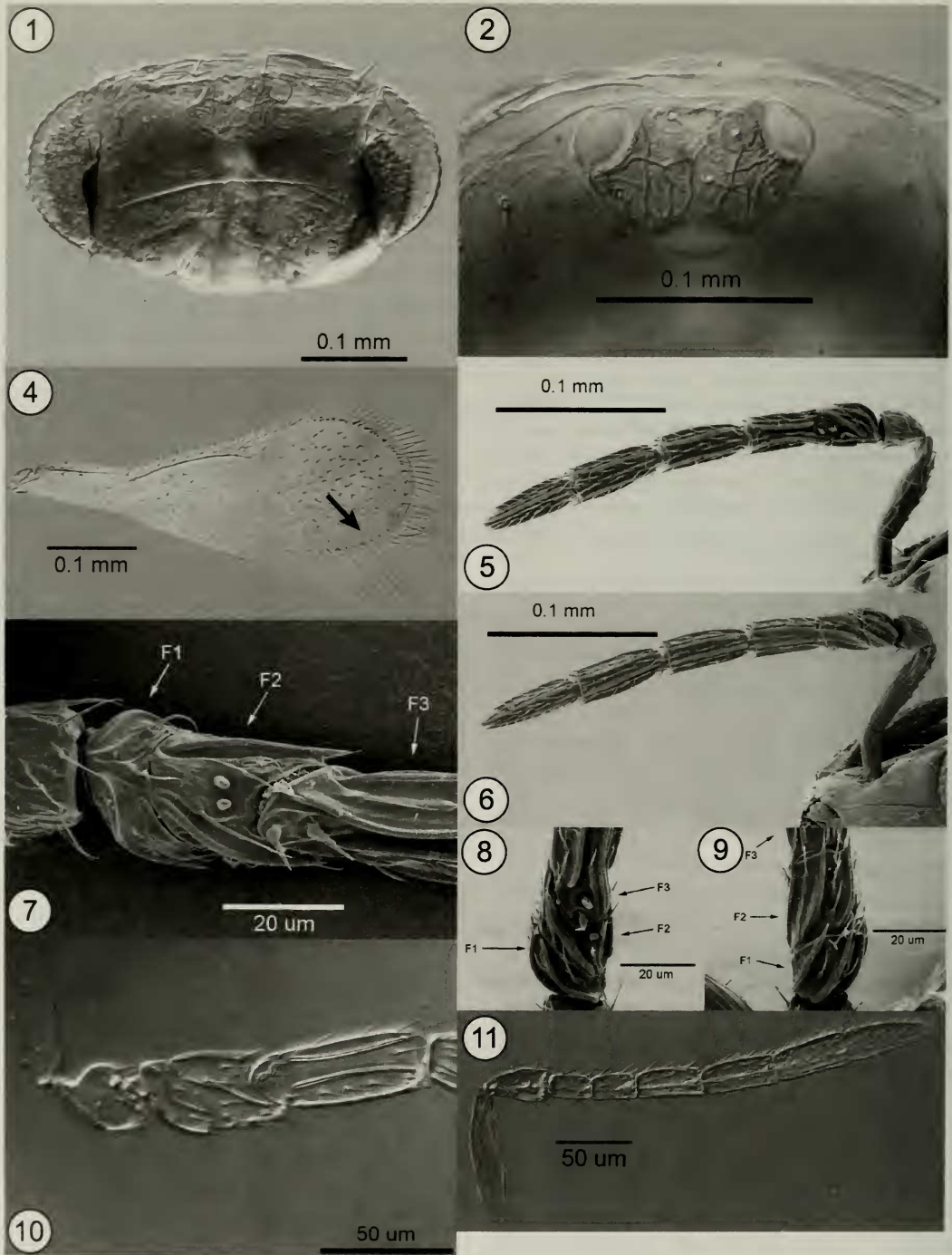
*Abbreviations.*—NHM: Natural History Museum, London, U.K., PPRII: Plant Protection Research Institute, Tehran, Iran

### *Encarsia perflava* species-group – revised diagnosis

*Both sexes.*—Tarsal formula 5-5-5, fore wing without an obvious asetose area around stigmal vein, though often sparsely setose in posterior distal area (arrowed in Fig. 4). Scutellar sensilla widely spaced, separated by more than  $2\times$  their diameter. Fore wing with marginal fringe relatively long, at least one third as long as maximum width. Emerging from Aleyrodidae.

*Female.*—Antenna with F1 and F2 approximately equal in length, clearly much shorter than remaining flagellomeres, and without longitudinal sensilla (Fig. 11).

*Male.*—Antenna with 6 flagellomeres; F1 and/or F2 and/or F3 always with specialised sensilla. These may be papillate,



Figs 1-2, 4-11. *Encarsia alemansoori* n. sp. 1-4, male holotype: 1, head; 2, stemmaticum; 4, fore wing; 5-9, male paratype: 5, antenna, inner aspect; 6, antenna, outer aspect; 7, 8, antenna, inner aspect, detail of F1-F3; 9, antenna, outer aspect, detail of F1-F3; 10, male holotype: antenna, inner aspect, detail of F1-F3 from slide-mount; 11, female paratype, antenna.

spiniform, ampulliform or pit sensilla (see Huang and Polaszek 1998, and Figs 5–10).

Currently included species: *ancistrocera*, *antiopa*, *bothrocera*, *?cappa*, *cibcensis duorunga*, *echinocera*, *farinaria ?hamulata*, *justicia*, *leptosoma*, *notha*, *perflava*, *?picta*, *synaptocera*, *viggianii*.

***Encarsia alemansoori* Rasekh & Polaszek  
n. sp.  
(Figs 1–12)**

**Description.**—Male. **Colour:** Head yellow, the stemmaticum and occiput brown (Figs 1, 2). Meso- and metasoma (Fig. 2) largely brown (as in typical male *Encarsia*); posterior mid lobe, side lobes, scutellum and propodeum centrally, yellow. Antennae and legs uniformly yellow. Fore wings (Fig. 4) hyaline or very faintly infusate below marginal vein.

**Morphology:** Stemmaticum with irregular vermiculate/reticulate sculpture (Fig. 3). Antenna (Figs 5–10) with F1–F3 greatly modified; F2 bearing 2 papillate sensilla ventrally, F3 with 2 ampulliform sensilla ventrally (Figs 5, 7, 8, 10). Mid lobe of mesoscutum (Fig. 2) with 6 setae arranged symmetrically, side lobes with 2 setae each. Scutellar sensilla widely separated, by a distance of about 3.5× the width of a sensillum. Distance between anterior pair of scutellar setae slightly smaller than between posterior pair. Fore wing (Fig. 4) 2.7× as long as maximum width of disc. Marginal fringe 0.54× as long as width of disc. Submarginal vein with 2 setae, marginal vein anteriorly with 7 setae. Basal cell with 3 setae. Tarsal formula 5-5-5. Apical spur of mid tibia subequal in length to short side of corresponding basitarsus. Tergites laterally with the following numbers of setae: T1: 0, T2: 1, T3: 1, T4: 1, T5: 4, T6: 4, T7 with 4 setae.

**Female.**—Morphology as for male, except for antennal (Fig. 11) and genitalia characters (Fig. 12). Antennal formula 1,1,3,3. F1 and F2 subequal and short, without sensilla. F3 and F4 with 2, F5 and F6 with 3,



Fig. 3. *Encarsia alemansoori* n. sp., dorsal meso- and metasoma.

sensilla. Ovipositor (Fig. 12) 1.6× as long as mid tibia. Third valvulae apically rounded, 0.46× as long as second valvifers.

**Species group placement.**—*E. perflava* group.

**Distribution.**—Iran.

**Host.**—*Aleuroclava jasmimi* (Takahashi).

**Material examined.**—Holotype ♂ (on slide), IRAN: Fars (Shiraz), Kazeroun 29°36'53"N 51°39'30"E Bahram Rasekh col. ex *Aleuroclava jasmimi* on *Aegle correa* 15.v.2009 (PPRII). Paratypes 2♀ (on slides), same data as holotype, DNA528, 529 (NHM, PPRII). Paratype ♂ (gold-coated for SEM) IRAN: Fars (Shiraz), 29°36'N 52°31'52"E Bahram Rasekh col. ex *Aleuroclava jasmimi* on *Citrus reticulata* × *C. limettioides* ("bakraei") 15.v.2009 (NHM). Paratypes (card-mounted) 12♀ IRAN: Fars (Shiraz), 29°36'N 52°31'52"E Bahram Rasekh col. ex *Aleuroclava jasmimi* on *Citrus reticulata* × *C. limettioides* ("bakraei") 15.v.2009 (NHM, PPRII).

**Comments.**—*Encarsia alemansoori* is morphologically most similar to *E. bothrocera*

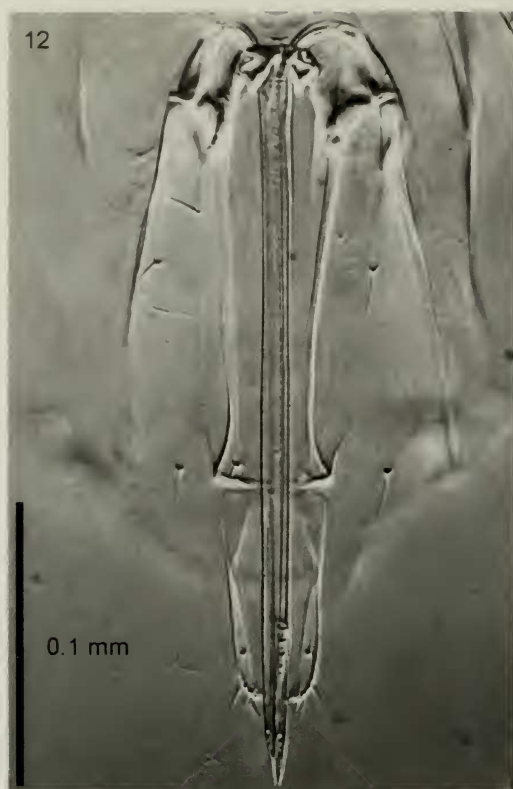


Fig. 12. *Encarsia alemansoori* n. sp., female paratype, ovipositor.

Huang & Polaszek, and *E. perflava* Hayat (Hayat, 1989; Huang and Polaszek, 1998). It can be distinguished from both these species by the following combination of characters: male: F1 without specialised sensilla; F2 with two papillate sensilla; F3 with two ampulliform sensilla (Figs 5–10); female: mid lobe of mesoscutum with 3 pairs of setae, side lobes each with 2 setae (mid lobe with 2 pairs, and side lobes with 3 setae in *E. bothrocera* and *E. perflava*). The females of all three species are otherwise very similar.

There has been a certain amount of confusion in the past concerning the *E. lahorensis* species-group established by Viggiani and Mazzone (1979), and the *perflava*-group established by Hayat (1989). Our current view is that the two groups are distinct, with *E. lahorensis* sharing very few of the diagnostic charac-

ters of the *perflava*-group. However, of the four species included in the group by Hayat (1989), only *E. perflava* and *E. leptosoma* appear to really belong there.

### *Encarsia hamata* Huang & Polaszek

*Encarsia hamata* Huang & Polaszek, 1998: 1888–1890.

Several new distribution and host records are now known since the description of this species from China, as follows:

*Distribution*.—China, Iran, Japan.

*Hosts*.—*Aleuroclava jasmini* (Takahashi), *Aleurolobus marlatti* (Quaintance) (Iran); *Bemisia shinanoensis* Kuwana (Japan).

*Material examined*.—1♂ IRAN: Fars (Shiraz), Kazeroun 29°36'53"N 51°39'30"E Bahram Rasekh col. ex unknown whitefly on *Ziziphus spinachristi* 15.v.2009 (DNA522a) (NHM); 2♀ IRAN: Fars (Shiraz), 29°36'N 52°31'52"E Bahram Rasekh col. ex *Aleurolobus marlatti* on *Citrus aurantium* 5.v.2009 (DNA523a/ 525) (NHM; PPRII); IRAN: Fars (Shiraz), Kazeroun 29°36'53"N 51°39'30"E Bahram Rasekh col. ex *Aleuroclava jasmini* on *Aegle correa* 15.v.2009 (DNA526, 527) (NHM, PPRII); 4♀ IRAN: Fars (Shiraz), Kazeroun 29°36'N 52°31'52"E Bahram Rasekh col. ex *Aleuroclava jasmini* on *Citrus reticulata* × *C. limettioides* ("bakraei") 15.v.2009 (NHM, PPRII); 1♀ IRAN: Fars (Shiraz), 29°36'N 52°31'52"E Bahram Rasekh col. ex *Bemisia tabaci* on *Helianthus annuus* 15.v.2009 (DNA531) (NHM; PPRII); 1♂ JAPAN: Shizuoka Prefecture, Kosai City 34°43'6.48"N 137°31'53.85"E 28.i.1999 M. Ota. Ex *Bemisia shinanoensis* on *Spiraea cantonensis* (NHM).

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